

Templeton-Whitney Grazing Allotments, Golden Trout Wilderness

Head Cut and Photo Point Monitoring, 2003 and 2010 (DRAFT)

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Introduction

Baseline monitoring sites were created in summer 2003 within the Templeton and Whitney grazing allotments to help understand recovery rates at sites experiencing degraded conditions. The allotments were not grazed since 2000 and in a "rested" or currently un-grazed setting. As a result of an appeal of the 2000 Templeton-Whitney Allotments Grazing decision, the Forest was instructed by the Regional Office (Region 5) to conduct monitoring in order to understand rates of recovery over a ten year period and at a later date analyze the allotments to determine if future grazing uses are feasible. Active head cuts, treated head cuts and other degraded sites in representative watersheds of the allotments were selected for monitoring. Head cuts are defined as the top of an actively eroding stream channel or gully of various sizes that result in gully formation or incision below and migration is caused by stream flow of various amounts and intensity over time, as dictated by hydrologic processes storm runoff events and site conditions.

Head cut (HC) sites were set up with fixed monuments and initial measurements to monitor and quantify over time the amount of upstream migration and effects to channel morphology and stability, to have an estimate of soil loss or downstream sedimentation and to observe changes to riparian vegetation or otherwise. Treated head cuts (THC), sites where previous attempts were made to arrest head cut migration were set as photo-point monitoring sites to make visual, qualitative observations and to understand treatment effectiveness in various hydrologic and environmental settings. Photo-points (PP) were also established with markers and tags at degraded, unstable sites such as stream banks, gullies, and open riparian meadow sites within the representative monitoring areas. Previously created photo-points within the monitoring areas (circa 1997-1999) were repeated in 2003 and 2010 to give a broader range of perspective where available. Each monitoring site was given an alpha-numeric identity number (i.e., HC-332, THC 333, and PP-334) and corresponding tag at the site, mapped, photographed and initial written observations and measurements were made. The following report shows and discusses findings of the 2010 monitoring as compared to initial baseline conditions, 2003.

Monitoring Areas

Monitoring sites were established in the following areas within the allotments. Templeton Allotment: Brown Meadow, Strawberry Meadow (upper and lower), Schaeffer Meadow, Death Canyon, Fat Cow Meadow and South Fork Tributary Meadow (near Brown Meadow). Whitney Allotment: Big Whitney Meadow (divided into five monitoring areas) and Stokes Stringer Meadows (divided into two monitoring areas).

Within a separate document (*Templeton Whitney Allotments Headcut-Photopoint Monitoring Summary*), the monitoring areas/sites are discussed along with the findings and summarized individually per allotment, showing monitoring results of the head cut sites, treated head cut sites and photo-point sites along with other observations and location maps. Each head cut monitoring site has tables with 2003 and 2010 data to show changes (found in appendices) and other pertinent information. In this document, the following pages displays comparative photos from 2003 and 2010 of each monitoring site along with description narratives on the Templeton and Whitney allotments.

TEMPLETON ALLOTMENT

Brown Meadow Sites



Above photo: Photo-point 337 (PP-337), upper Brown Meadow above cow camp, July 2003. Site is a degraded stream bank with missing soil and sod layer. **Below photo:** PP-337 photo re-taken August 2010. Riparian vegetation has moved upslope on bare soil area and starting to fill in. This is indicative of the water table rising and aggrading floodplain. The site is still vulnerable to erosion from disturbance but is in an upward trend.

Templeton and Whitney Allotments – 2003 and 2010 Head Cut and Photo Point Monitoring



Above photo: Photo-point 338 (PP-338) Brown Meadow, July 2003. Site has an eroding scour pool with a small head cut and eroding banks. **Below photo:** PP-338 Brown Meadow with photo re-taken August 2010. Not a lot of noticeable change. Banks have started to stabilize with new vegetation. The scour pool has become larger and the surrounding banks are bare and slightly more unstable than in 2003. The HC has migrated only 0.50 meters. The site over time should find equilibrium and stabilize, but it still vulnerable to outside disturbance that may continue instability.



Above photo: Head cut 332 (HC-332) Brown Meadow, July 2003. HC-332 is a small in-channel HC that has caused moderate gully formation below. **Below photo:** HC-332 Brown Meadow photo re-taken August 2010. HC has migrated 5.79 meters since 2003. At the time of repeat monitoring, it appears the head cut has run its course and has begun to reach equilibrium with the natural gradient of the meadow. A moderately deep gully (approximately 0.70 meter depth by 2.1 meter width) exists below HC for a short distance and banks are moderately undercut below the rooting zone. Future threat of rapid HC migration at this site is low to moderate. Strong riparian vegetation and soil structure should slow erosion.



Above photo: Head cut 333 (HC-333) Brown Meadow, July 2003. HC 333 is a small head cut in the main channel of Brown Creek. **Below photo:** HC-333 Brown Meadow photo re-taken August 2010 from same site. HC had migrated < 1 meter, likely due to well-developed vegetation on stream banks and good rooting depth along channel that slows erosion. Vegetation is more robust and active than in 2003. Head cut migration rate is slow.



Above photo: Head cut 334 (HC-334) Brown Meadow, July 2003. Large and active HC was found in administrative pasture near cow camp. Sub soil at this site is comprised of deep, unconsolidated alluvial materials, mostly fines and erodes easily when vegetation is thin and exposed to surface runoff and groundwater sapping. Rooted vegetation (shallow organic horizon) is moderately established in this area. **Below photo:** HC-334 photo retaken August, 2010. Head cut has migrated 3.90 meters since 2003 and has approximately doubled in width and depth below the HC. This site is unstable and will likely continue to unravel rapidly as large runoff events occur and is vulnerable to additional disturbances. Careful prescription and treatment for head cut stabilization is recommended. However, a risk of treatment failure exists with the soil condition at this site.



Above photo: Head cut (HC) 335, upper Brown Meadow, photo taken July 2003. This HC was set up with monuments to measure upstream migration. The head cut face and sides have exposed, rooted soil.

Below photo: HC 335 upper Brown Meadow re-taken August 2010. Head cut has not moved since 2003. Overall, the head cut face and sides are re-vegetating and stabilizing, with the gully below filling in since 2003. Organic soil is cohesive with strong vegetative roots and is resistant to erosion. Most likely this HC will continue to stabilize as it is controlled by the vigorous vegetative mat.



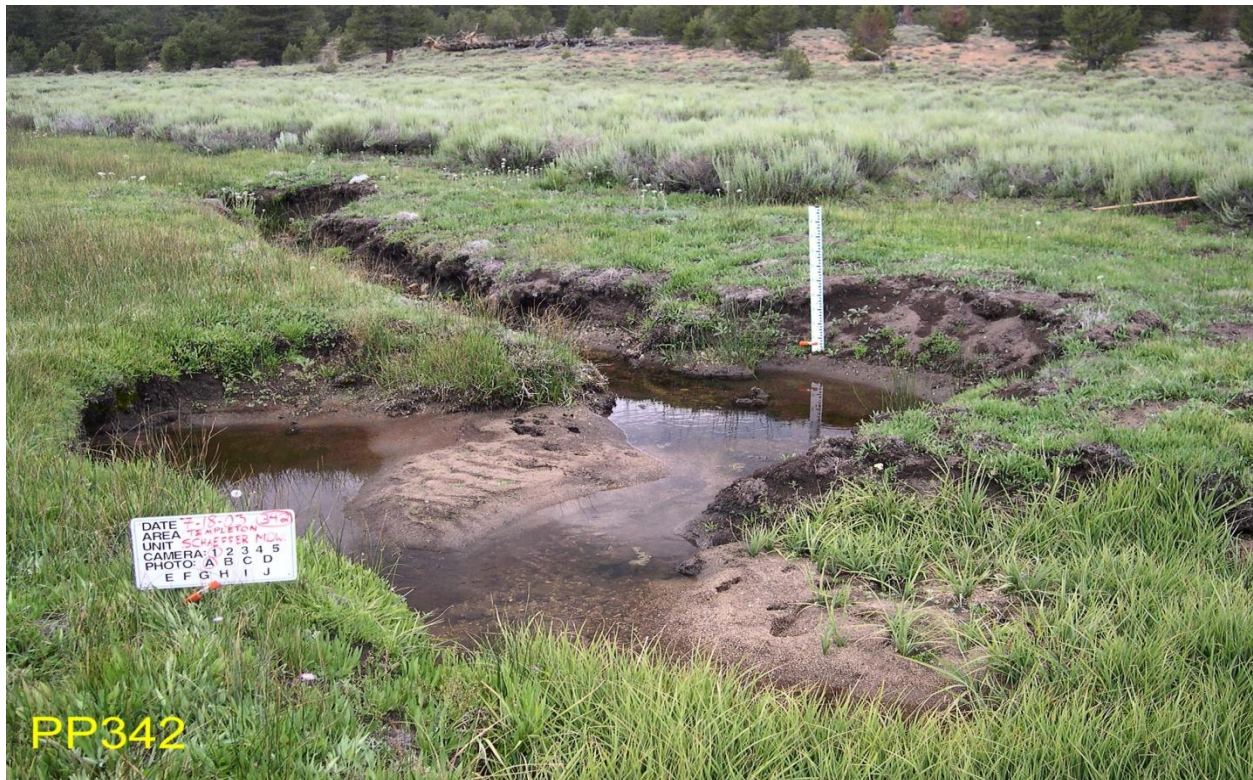
Above photo: Reference photo only, not an established photo point. View is looking at riparian vegetation along Brown Creek at the Administrative Pasture near the cow camp at the northern boundary, photo taken July 2003.

Below photo: Same site with photo re-taken August 2010. Riparian vegetation has filled in and willow growth increased, adding to overall meadow stability at this site.

Schaeffer Meadow Sites



Above photo: Photo point 341 (PP-341), Schaeffer Meadow, July 2003. Terrace banks along stream are mostly bare of vegetation within historic incised channel. **Below photo:** PP-341 Schaeffer Meadow photo re-taken August 2010. Channel bottom has slightly aggraded with soil and vegetation along with elevated water table. Vegetative cover is now moving up the terrace banks and starting to stabilize bare soil area. Soils are wet and terrace banks are still vulnerable to disturbance, although more resilient than in 2003.



Above photo: Schaeffer Meadow photo-point 342, taken July 2003. In-channel focus is on bare, unstable stream banks and soil. An active head cut exists 9 meters upstream of site. **Below photo:** Photo-point 342 re-taken August 2010. Point bar in foreground has increased vegetation and adjacent stream banks also since 2003 and overall vegetative stability has increased. Still vulnerable to erosion is the gully above that is well scoured and bare from recent high flows and an active head cut is still migrating upstream. Even with moderate recovery this site is still at risk from disturbance.

Templeton and Whitney Allotments – 2003 and 2010 Head Cut and Photo Point Monitoring



Above photo: Head cut 339 (HC 339) lower Schaeffer Meadow, July 2003. Medium size head cut migrating into strongly vegetated floodplain. Gradient at this point starts to increase. Sub soil at this site is rocky, sand and silt. **Below photo:** HC 339, lower Schaeffer Meadow photo was re taken August, 2010. Head cut has migrated only 0.55 meters but has steepened, widened and incised below. Head cut is more exposed and susceptible to additional erosion. Strong vegetation and rocky subsoil helps to slow HC migration at this site.

Templeton and Whitney Allotments – 2003 and 2010 Head Cut and Photo Point Monitoring



Above photo: Head cut 340 (HC 340) Lower Schaeffer Meadow, July 2003. This is a large, active HC with a wide face and incised channel migrating into floodplain area. Soil substrate is rocky with fines. Organic layer is fairly deep. **Below photo:** HC 340 Lower Schaeffer Meadow with photo re taken August, 2010. Head cut face has widened and developed into two active HC's. HC to left has migrated 1.9 meters (most active). Strong vegetation, deep root zone and rocky subsoil slow HC migration rate under typical runoff conditions.



Above photo: Head cut 343 (HC 343) Upper Schaeffer Meadow, July 2003. HC 343 is a large open bowl head cut with undercut sod layer on face and incised scour pool below. **Below photo:** HC 343 upper Schaeffer Meadow with photo re taken August, 2010. HC has migrated 1.25 meters since 2003, banks along scour pool have collapsed and scour pool has widened extent. Very strong, rooted vegetation and deep organic layer have slowed HC migration. Sub soil layers are comprised of dense organic layers with intermittent layers of fines and gravel.



Above photo: Head cut 344 Upper Schaeffer Meadow, July 2003. A very large, scallop type HC with eroding face. No gully below. **Below photo:** HC 344 Upper Schaeffer Meadow, with photo re taken August, 2003. HC has slowly migrated (0.95 meters) and has widened in extent since 2003. Strong vegetation and dense organic layers in substrate slows migration rate. Photo of same site was taken in July 1997. Floodplain in channel below HC is recovering and robust.

Strawberry Meadow Sites



Above photo: Photo-point 345 1-A, Strawberry Meadow looking east down creek, July 2003. Willows and other riparian vegetation showing recovery three years after grazing was rested. **Below photo:** Same site with photo retaken August 2010. Willow and sedge growth has significantly increased and the stream channel and banks are stable along this reach, a productive site. Soils are wet within this area as the stream is able to access floodplain during average peak flows and ground water is shallow, deep organic soil exists.

Templeton and Whitney Allotments – 2003 and 2010 Head Cut and Photo Point Monitoring



Above photo: Photo-point 345-2A, Strawberry Meadow July 2003. Willow growth along Strawberry Creek is showing signs of recovery along with sod cover. This was a grazing key area of use in Strawberry Meadow.

Below photo: Same site with photo retaken August 2010. Willow development has significantly increased in vigor and numbers (along creek) and overall sod cover has improved, with the exception of rodent disturbance creating pockets of bare and disturbed soil as seen in foreground.

Templeton and Whitney Allotments – 2003 and 2010 Head Cut and Photo Point Monitoring



Above photo: Treated Head Cut (THC) 348, Upper Strawberry Creek ½ mile below Cow Camp, July 2003. HC was initially treated in 1998 with log headwall and rock chute and treatment held for many years. **Below photo:** THC 348 Upper Strawberry Creek, August 2010. Structure failed, was placed on meander bend, poor prescription. Organic rooted layer shallow here with loose subsoil, high erosion potential. Head cut migrated upstream 100 feet and is active, has formed a gully. With loose subsoil structure was at risk, voles contributed to bank erosion. Structure most likely failed during snowmelt peak flows of 2010. Very unstable site, stream banks are subject to additional erosion from peak flows and disturbance. Future treatment for active head cut will need further prescription analysis so to not repeat failure.

Templeton and Whitney Allotments – 2003 and 2010 Head Cut and Photo Point Monitoring



Above photo: Head cut 346 (HC 346) Fat Cow Meadow, July 2003. Wide, in channel head cut on ephemeral channel with a shallow organic horizon and deep, alluvial rocky substrate. **Below photo:** HC 346, Fat Cow Meadow with the photo re taken August, 2010. Head cut has widened slightly and migrated only 0.85 meters. Slow HC migration likely due to high amounts of cobble in subsoil and a fair vegetative cover. Flow is more overland during runoff and not channelized, thus slowing velocity and erosion potential.



Above photo: Head cut 347 (HC 347) Fat Cow Meadow, July 2003. This site has a similar condition to HC 346 Fat Cow which is a short distance (50 meters) upstream, with moderately shallow organic horizon and deep, alluvial, non-cohesive sand and cobble substrate. **Below photo:** HC 347, Fat Cow Meadow with photo retaken August 2010. The head cut slowly migrated 0.45 meters since 2003 due to fair vegetative cover, rocky soil substrate and overland flow conditions. Riparian vegetation at site has increased and is more robust.



Above photo: Head cut 349 (HC 349) Upper Strawberry Creek below Templeton Cow Camp, July 2003. A small in-stream head cut in a well vegetated meadow with deep organic soil horizon and root depth. **Below photo:** HC 349 Upper Strawberry Creek with photo re-taken August, 2010. Head cut has moved little since 2003, 0.33 meters. At this site this is likely due to peak stream flows tending to access well-vegetated floodplain which dissipates stream energy, along with strong vegetative cover and deep, rooted organic horizon that slows HC migration rate. This type of site is resistant to in stream erosion and impacts.

South Fork Tributary Meadow – ½ Mile Northwest of Brown Meadow



Above photo: Taken July 2003, Photo-point 330, South Fork Tributary meadow ½ of a mile NW of Brown Meadow. Site is a small area of disturbed sod with various nick points and bare soil, mostly well drained with a shallow organic layer and southern aspect tends to dry easily. **Below photo:** Same site with photo retaken August 2010. Vegetative cover and stability has moderately increased and erosion has slowed. However, bare nick points are still vulnerable to erosion. Slow recovery site.

Templeton and Whitney Allotments – 2003 and 2010 Head Cut and Photo Point Monitoring

Death Canyon Creek-Death Canyon Tributary Sites



Above photo: Taken July 2003, Photo-point 353 an open “scallop” located in Death Canyon tributary meadow. Cause of sod layer loss is unknown. Overland flow from meadow is captured in the depression with light erosion occurring along edges of the opening. **Below photo:** Same site with photo retaken August 2010, slight improvement as scallop is showing healing, increased vegetation around perimeter and in bottom, overall narrowing of opening, slow progress. Most of the surrounding meadow retains sod layer and is on a low gradient with overland flow regime.

Templeton and Whitney Allotments – 2003 and 2010 Head Cut and Photo Point Monitoring



Above photo: Outlet of Big Dry Meadow (Dry Creek) just above Death Canyon confluence, July 2003 of an unnamed active head cut (Site M2). Photo was taken for reference only, no monuments. **Below photo:** Same site with photo retaken August 2010. Head cut has migrated approximately 3.5 meters and slightly widened. Large rock and boulder substrate checks erosion rates. Overland flow does not fully concentrate at head cut and spreads into nearby lateral channels. Disturbance at head cut could increase erosion rates.



Above photo: Head cut 351 (HC 351) Death Canyon Creek, July 2003. Wide scour pool below HC with exposed sod banks. Deep, well-rooted organic soil horizon and robust riparian vegetation exist at site. **Below photo:** HC 351 Death Canyon Creek with photo re taken August 2010. Scour pool at HC 351 has widened and lengthened as sod banks have started to unravel and balance. Deep organic horizon and robust vegetation has slowed HC migration, HC has migrated only 2.22 meters. Floodplain above HC is stable and intact.



Above photo: Head cut 350 (HC 350) Death Canyon Creek, July 2003. Moderately deep scour pool HC in well developed flood plain, does not have a gully below. **Below photo:** HC 350, Death Canyon Creek with photo re taken August 2010. Head cut has only migrated 1.22 meters since 2003 and a widened area of soil has been removed from erosion. Floodplain vegetation is very strong and robust and dense organic soil layers combined with low gradient are slowing HC migration rate. Floodplain is showing indications of elevating since 2003 as riparian vegetation is further up on terraces. Scour pool below HC is starting to fill in with sedge.

Templeton and Whitney Allotments – 2003 and 2010 Head Cut and Photo Point Monitoring



Above photo: Head cut 355 (HC 355) Death Canyon Tributary, July 2003. HC 355 is a large and open HC with gully formation below. Photo was also taken of this HC in 1997. **Below photo:** Repeat photo was taken August 2010. Additional erosion has occurred since 2003 HC has migrated 1.83 meters which is slow migration but HC has deepened and widened and is active. HC has incised below root zone and is undercutting banks. This condition could lead to increased migration if a large hydrologic event occurs. There are two successfully treated HC's just above HC 355 that could be threatened with migration. This HC is a candidate for stabilization treatment as a healthy sod layer exists to work with.



Above photo: Treated Head Cut 352 (THC 352), Death Canyon Tributary July, 2003. THC 352 was initially treated in 2002 by the Inyo watershed crew. Head cut was sloped, covered with inka-mat filter cloth and armored with large rock. Open space between the armor was set up to allow infiltration and solar exposure and a few sod plugs were placed. **Below photo:** THC 352 Death Canyon Tributary with photo re taken August 2010. Treatment has fully stabilized the site. Overall floodplain level at site has elevated with vegetation filling in over the structure providing strength. Gully below structure has filled in and elevated, treatment has met prescription objectives.

Templeton and Whitney Allotments – 2003 and 2010 Head Cut and Photo Point Monitoring



Above photo: Treated Head Cut 354 (THC 354) Death Canyon Tributary, July 2003 one year after initial treatment (2002). THC 352 is approximately 35 meters upstream. Once an open faced, deep, scalloped HC, the HC was sloped and inka-mat filter cloth was used as an underlayment with rock armor structure on surface. **Below photo:** THC 354 Death Canyon Tributary with photo re taken August 2010. Floodplain vegetation has elevated and is filling around structure providing an anchor and resistance to scour from peak flows. Prescription objectives have been met. Favorable low gradient floodplain with overland flow and with deep organic layer and well developed, rooted vegetation is a key factor in treatment success.



Above photo: Treated Head Cut 251, (THC 251) Death Canyon Tributary July 2003. A two tier rock chute structure, no filter cloth underlayment was used. **Below photo:** THC 251 Death Canyon Tributary with photo re taken August 2010. Structure has some light amounts of filling of vegetation on banks that has occurred, flow has started to migrate out of the structure to the right side facing upstream and a small new head cut has formed at the top of the upper tier. Not using filter cloth may have contributed the structure problems. THC is in need of repair to re-stabilize.



Above photo: Monitoring Site 2 (M2), an unnamed head cut, Death Canyon Tributary, July 2003. Photo was taken for observation purposes, monuments and other HC data was not set up at this site. Same site photo was taken during 1997 Amendment 6 monitoring. **Below photo:** M2 Death Canyon Tributary with photo re taken August 2010. Head cut has not migrated much, approximately 1 meter and has widened in area and soil erosion is occurring. Large boulders in channel will likely restrict head cut migration in the future, site is unstable.

WHITNEY ALLOTMENT

Section 1 Stokes Stringer



Above photo: Photo point 373-1A (PP 373 1A) Stokes Stringer section 1, September 2003. The hummocks on the higher knolls are obvious, vegetation cover is thin. **Below photo:** PP 373 1A photo retaken September 2010. Hummocks have started to lose definition and have more vegetative cover. Floodplain in channel has started to aggrade and sedge is expanding upwards to upper slopes. Overall, vegetation and soil stability has increased. Hummocks are still vulnerable to disturbance due to wet soil conditions.

Templeton and Whitney Allotments – 2003 and 2010 Head Cut and Photo Point Monitoring



Above photo: Photo point 373 2A (PP 373 2A) Stokes Stringer section 1, September 2003. This is a closer view of PP 373 1A and area immediate to drainage and floodplain. **Below photo:** PP 373 2A photo retaken September 2010. Riparian vegetation (mostly sedge) has increased cover and density in channel and adjacent slopes are filling in with vegetative cover (over hummock areas). Water table has elevated since 2003 to a moderate degree. Rodent activity has slowed. Old incised drainage is aggrading towards terraces. Site has wet, vulnerable soil.



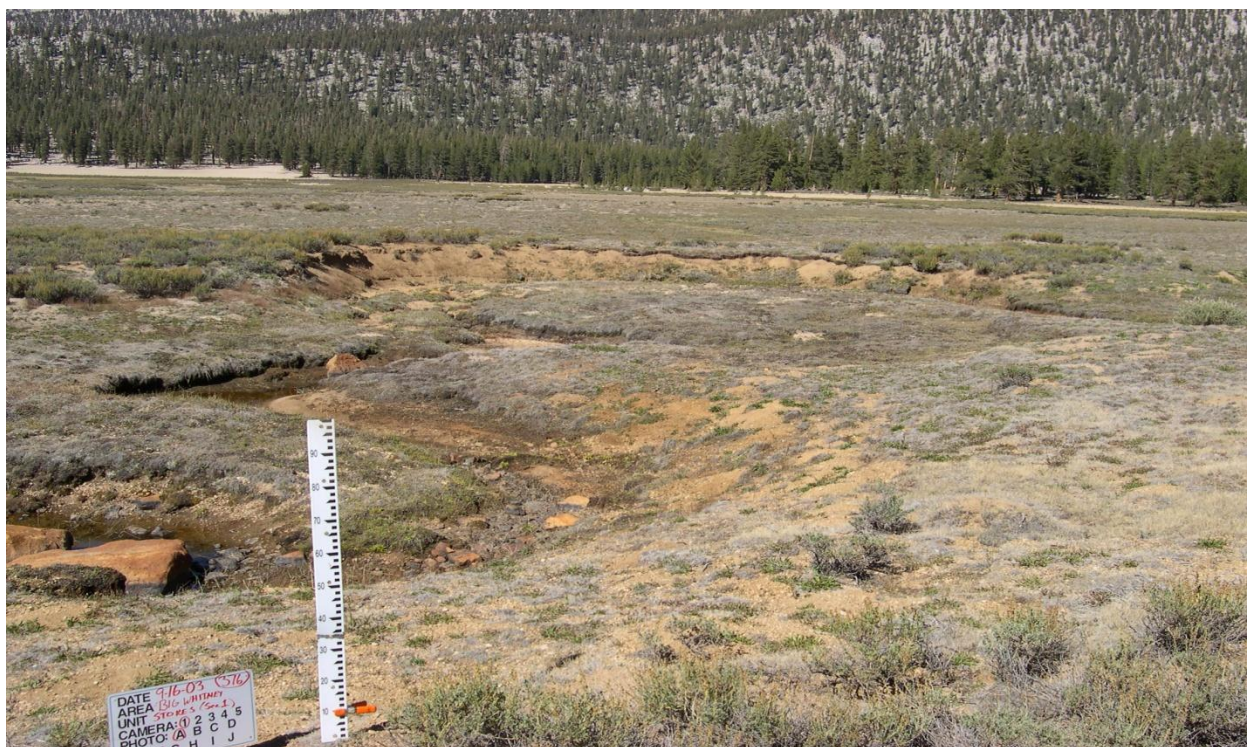
Above photo: Overview of Stokes Stringer, section 1 September 2003. **Below photo:** Overview of Stokes Stringer photo re-taken September 2010. Overall riparian vegetative cover has increased since 2003.



Above photo: Photo point 374 Stokes Stringer section 1, September 2003. Photo shows partial bare ground and eroded hummocks with diminished vegetation. **Below photo:** Retake of photo September, 2010. Hummock areas have started to heal and vegetative cover has increased significantly over the area adding to soil stability. Soils are very moist to wet within the drainages.

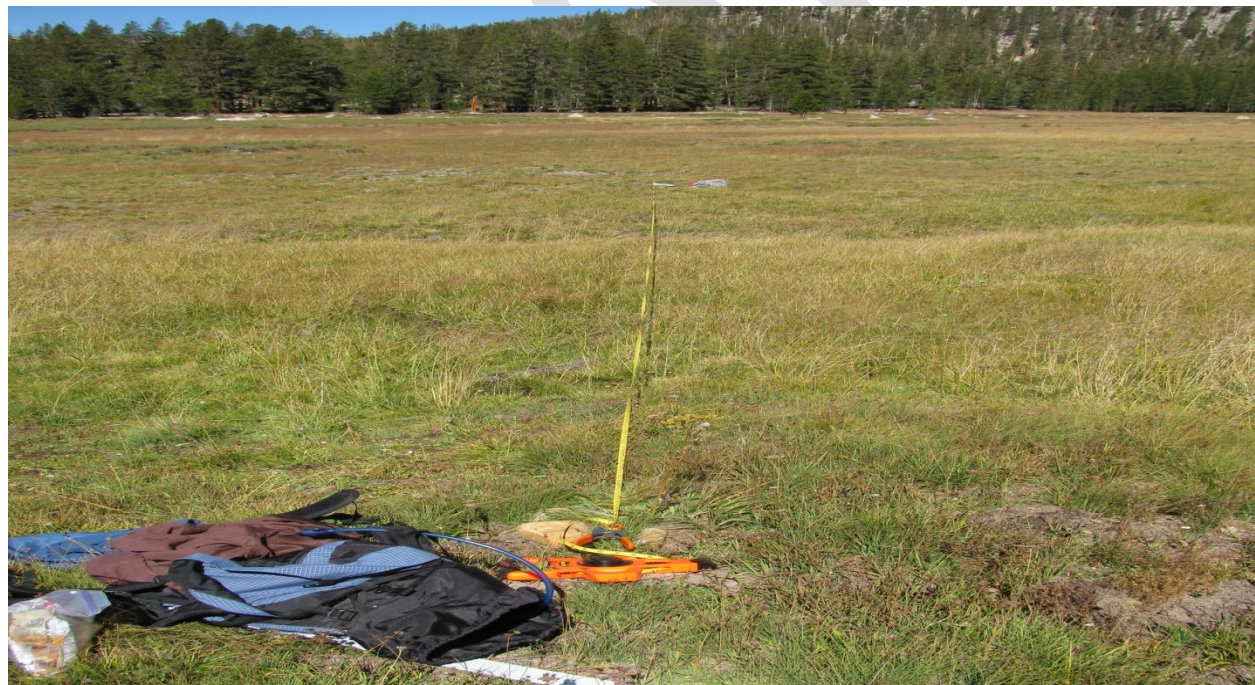


Above photo: Head cut 375 (HC 375) Stokes Stringer Section 1, September 2003. Tape transect is where top of head cut is located. Thin organic horizon exists at this site (0.01m) and alluvial. **Below photo:** HC 375 Stokes Stringer section 1 retake of photo September 2010 showing 2003 transect (at meter rod). Head cut has advanced 46 meters since 2003. Thin organic layer and deep, underlying loose alluvial soils are conducive to head cut migration at this site, the head cut will continue to rapidly move upstream with each runoff event. Site is sensitive to disturbance.



Above photo: Photo point 376 (PP 376) Stokes Stringer Section 1, September 2003. The terrace banks and floodplain within the channel are degraded with large areas of bare soil. **Below photo:** PP 376 photo retaken September 2010. Floodplain in channel bottom has moderately increased vegetation and terrace banks have slightly improved with vegetative cover and are still vulnerable to erosion. Stream channel is starting to set meanders with slightly improved bank stability. Thin organic horizon exists at this site, conducive to erosion.

Section 2 Stokes Stringer



Above photo: Head cut 377 (HC 377) Stokes Stringer Section 2, September 2003. Looking across transect to north. Vegetation cover is weaker at this time and moderate amounts of bare ground are noticeable. **Below photo:** HC 377 Stokes Stringer Section 2 photo was retaken September 2010. Vegetative cover has increased and less bare soil is apparent. HC has migrated 19.5 meters upstream and a secondary active HC is found 13 meters above current location of HC 377. Thin organic horizon, shallow rooting depth and sandy surface soil may aid in headcut migration.



Above photo: Head cut 378 (HC 378) Stokes Stringer Section 2, September 2003. **Below photo:** HC 378 Stokes Stringer section 2, retake of photo September 2010. HC has migrated 3.60 meters since 2003, organic horizon and rooted vegetation at this site is deeper and tends to resist erosion during high flows.



Above photo: Photo point 379 1A (PP 378 1a) aka 1999 PP 17, Stokes Stringer Section 2, September 2003. Small head cut where meter rod is seen in photo. **Below photo:** PP 378 1A Stokes Stringer Section 2 photo retaken September 2010. Head cut is controlled by existing grade and form of channel and no longer is migrating. Bank vegetation has increased and channel has narrowed and stabilized. No issue.

Templeton and Whitney Allotments – 2003 and 2010 Head Cut and Photo Point Monitoring



Above photo: Photo point 379 1B (PP 379 1B) aka PP 17 1999 Stokes Stringer Section 2, September 2003. Looking down incised channel below head cut to meadow. **Below photo:** PP 379 1B Stokes Stringer Section 2 photo retaken September 2010. Incised channel is showing slight to moderate aggradation, increased vegetation on banks is providing stability and narrowing channel.

Section 2 Big Whitney Meadow



Above photo: Head cut 380 (HC 380) Big Whitney Meadow Section 2, September 2003. AKA PP taken in 1999. Active head cut in channel, riparian vegetation is thin and bare ground exposed. **Below photo:** HC 380 Big Whitney Meadow Section 2, photo re taken September 2010. Channel has filled with deposition from uplands above meadow and re-directed stream flow to another path. Widespread organic/silt deposition was found over entire site, a small remnant of the previous head cut found in 1999 is left upstream of the previous location approximately 20 meters. Vegetation productivity has significantly increased since 2003 and the meadow has a new floodplain. HC monuments set in 2003 were not relocated for measurements due to the large volumes of deposition at the site.

Templeton and Whitney Allotments – 2003 and 2010 Head Cut and Photo Point Monitoring



Above photo: Photo point 381 (PP 381) Big Whitney Meadow Section 2, September 2003. A large area of fragmented sod and bare ground with weakly growing riparian vegetation exists. **Below photo:** PP 381 Big Whitney Meadow Section 2, photo was re-taken September 2010. Riparian vegetation ground cover has moderately increased with areas of fragmented sod and bare ground still present. Site is still vulnerable to disturbance.

Section 1 Big Whitney Meadow



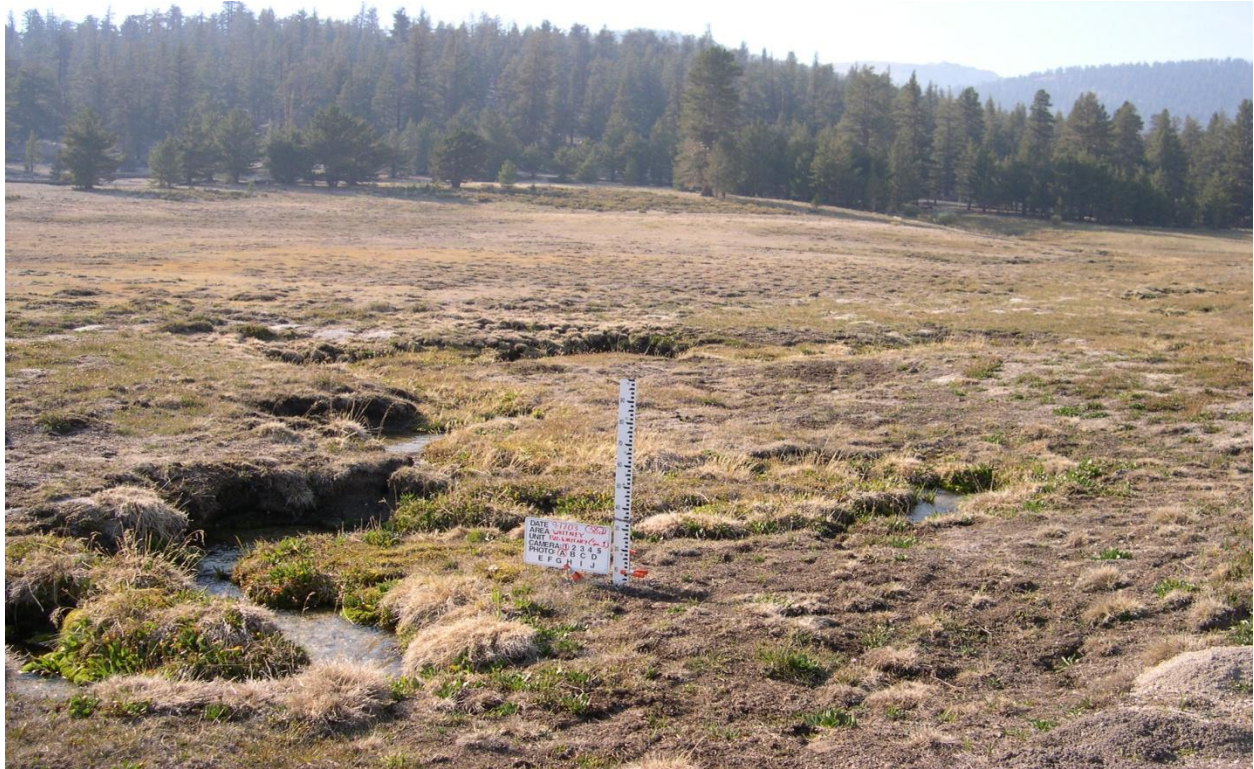
Above photo: Treated Head Cut 88 (THC 88) Big Whitney Meadow Section 1, September 2003. A rocked chute (3 chutes) treated HC sloped back with inka-mat filter cloth underlayment installed in 1999. At this time the structure and prescription was working very well, no need for maintenance. **Below photo:** THC 88 Big Whitney Meadow Section 2 photo was retaken September 2010. Head cut and structure very stabilized by encroaching riparian vegetation taking hold around structure, fully successful prescription. Riparian vegetation is more robust above HC. Structure could be vulnerable to grazing disturbance.



Above photo: Treated head cut 85 (THC 85) Big Whitney Meadow Section 1, September 2003. Eroded hummocks and weak vegetation is present. Structure is holding well at the time. **Below photo:** THC 85 Big Whitney Meadow photo re-taken September 2010. Channel has aggraded and robust riparian vegetation holding structure (rock chute with filter cloth) and banks. Hummocks are showing relief reduction and the water table has elevated. This is a wet site.



Above photo: Treated Head Cut 87 (THC 87) Big Whitney Meadow Section 1, September 2003. A rock chute/filter cloth structure is holding well. Vegetation is weaker and hummocks are present. **Below photo:** THC 87 Big Whitney Meadow Section 1 with retaken photo September 2010. Rock chute has been overgrown by robust riparian vegetation and water table has elevated. This is a very wet site that could be vulnerable to disturbance.



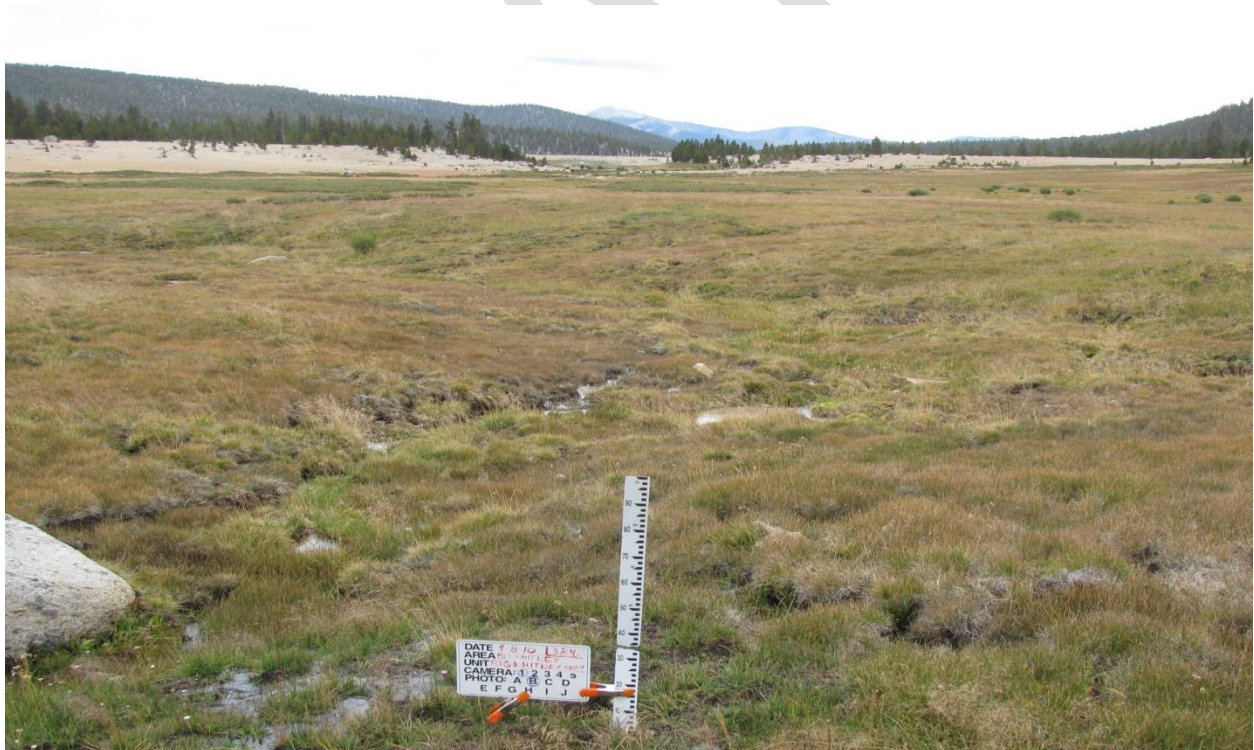
Above photo: Photo point 382 (PP 382) Big Whitney Meadow Section 1, September 2003. Hummocks are prevalent over the area, stream banks are mostly degraded and vegetative vigor is low. **Below photo:** PP 382 Big Whitney Meadow Section 1 photo retaken September 2010. Hummocks have started to diminish in form but still present. Stream banks are still unstable and degraded but with better vegetation. Floodplain vegetation overall has improved moderately at this site. Site is very wet and vulnerable to disturbance.

Templeton and Whitney Allotments – 2003 and 2010 Head Cut and Photo Point Monitoring



Above photo: Head cut 383 (HC 383) Big Whitney Meadow Section 1, September 2003. HC 383 is an active HC with eroded hummocks around site. **Below photo:** HC 383 Big Whitney Meadow Section 1 photo retaken September 2010. Head cut has migrated 1.07 meters since 2003, slow migration due to strong organic horizon and deep rooted vegetation at site. The site is very wet and vulnerable. Scour pool has increased in area since 2003. Hummocks are still present but starting to diminish, floodplain vegetation has increased.

Templeton and Whitney Allotments – 2003 and 2010 Head Cut and Photo Point Monitoring



Above photo: Photo point 384 (PP 384) Big Whitney Meadow Section 1, September 2003. Broad area of hummocks and eroded soil, vegetative cover is weakened. **Below photo:** PP 384 Big Whitney Meadow Section 1 photo retaken September 2010. Hummocks are still present but have less relief and increased vegetative cover. The soil in this area is very wet, many springs and seeps exist and ground water is very shallow. This site is sensitive to disturbance.



Photo: Golden Trout Creek lower end of Section 1 Big Whitney Meadow, September 2003. Stream banks stable due to large boulder component and strong vegetation. Moderate hummock formations found within seep areas near creek and small areas of bare ground. Another photo of this site was taken August, 1999. Photo on next page shows September 2010 retake.



Photo: Golden Trout Creek lower Section 1 Big Whitney Meadow, September 2010. Little change since 2003, some increase of rodent activity on upper banks and disturbed soil. Stream flow is higher and water quality appears improved. Many golden trout seen along this reach.

Section 4, Big Whitney Meadow



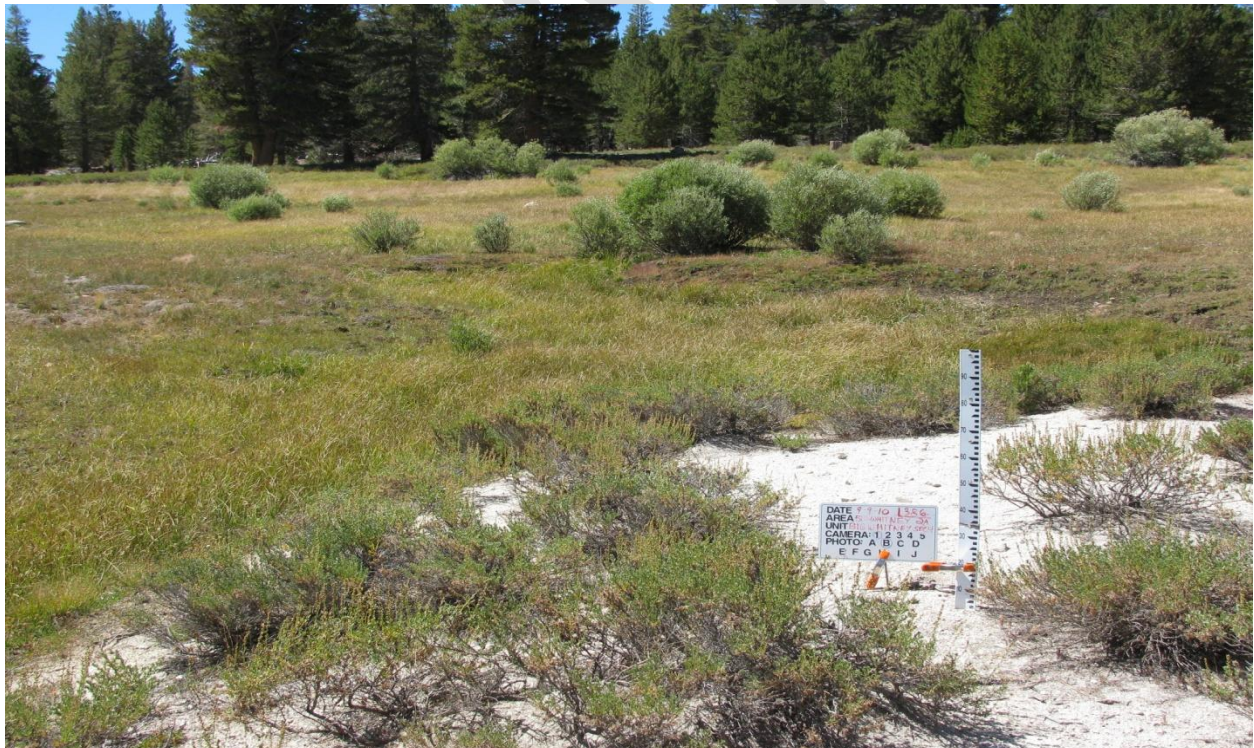
Above photo: Photo point 385 (PP 385) Big Whitney Meadow Section 4, September 2003. The site is a large area of springs and seeps and drainage channels. Hummocks cover a high percentage of the site, soil erosion is occurring along channels and hummocks. Very wet soils exist, vulnerable to disturbance. **Below photo:** PP 385 Big Whitney Meadow Section 4, photo was retaken September 2010. Hummocks have diminished moderately and have increased vegetative cover. Channels appear more stable with increased vegetation. Still very wet at site and soils are fragile.

Templeton and Whitney Allotments – 2003 and 2010 Head Cut and Photo Point Monitoring



Above photo: Photo point 386 1A Big Whitney Meadow, September 2003. Site is a large area of bare ground, missing sod and eroded soil with a small barren head cut and gully. Vegetative cover is thin and weak.

Below photo: PP 386 1A Big Whitney Meadow Section 4, photo retaken September 2010. Vegetative cover has increased to a high percentage and the face of the head cut and gully has stabilized with new growth and is starting to aggrade. Willows have increased in numbers and vigor, and the water table has elevated. There is still a large area of erosion vulnerable bare ground at site.



Above photo: Photo point 386 2A (PP 386 2A) Big Whitney Meadow Section 4, September 2003. Large area of bare ground and missing sod with active erosion and a large head cut and gully. Site is just adjacent to PP 386 1A to south. **Below photo:** Vegetation cover has increased significantly filling in and stabilizing barren gully and face of head cut, and gully has started to aggrade. Willow growth has increased and water table has elevated. There are still areas of bare ground to a lesser percentage than in 2003.



Photo: Treated head cut 387 (THC 387), Big Whitney Meadow Section 4, September 2003. A rocked chute and bank head cut treatment completed in the early 1990's. Sod is missing throughout site and bare, eroding ground is apparent. Vegetation is thin and moderately weak. Treatment slowed head cut migration. See following page for 2010 photo.



Photo: THC 387, Big Whitney Meadow Section 4, September 2010. Vegetation cover has significantly increased and gully and head cut structures have fully stabilized and filled in with sedge. Some vulnerable bare ground still exists. Willow growth has increased well also. Upward vegetative trend, recovery at site is in progress, not fully recovered.



Above photo: Spring area and hummock slopes in Big Whitney Meadow Section 4, September 2003. Site is also known as photo point 9 from 1999 amendment 6 surveys. Large spring with active flow, eroded hummocks are prevalent on slopes. Soils are very wet and vulnerable to disturbance. **Below photo:** PP 9, retaken September 2010. Vegetation has increased in vigor and erosion has slowed, hummocks have lessened in size and are still prevalent.



Above photo: Photo point 9, 1999 Big Whitney Meadow Section 4, September 2003 at spring and seep area. Photo was also taken in 1999. Hummocks and eroding flow pathways are noticeable and areas of bare soil.

Below photo: PP 9 1999 Big Whitney Meadow Section 4, September 2010. Hummocks and rills have diminished moderately, vegetation cover has increased and bare soil areas are less but still present. This is a very wet site that is subject to impacts from disturbance.

Templeton and Whitney Allotments – 2003 and 2010 Head Cut and Photo Point Monitoring

Section 5, Big Whitney Meadow



Above photo: Photo point 388 (PP 388) Big Whitney Meadow Section 5, September 2003. This site is also known as PP 11 from 1999 amendment 6 surveys. The site is a large area or swale of large, eroding hummocks and bare ground. **Below photo:** PP 388 Big Whitney Meadow Section 5, photo retaken September 2010. Hummocks have lessened in size and extent and vegetative cover has increased. Bare ground area in foreground has started to recover with growth and stability. Hummocks are still prevalent on hill slope in wet soil area.

Templeton and Whitney Allotments – 2003 and 2010 Head Cut and Photo Point Monitoring



Above photo: Photo point 13 (1999) Big Whitney Meadow Section 5, September 2003. Floodplain in incised channel recovering, adjacent terrace banks have hummocks, bare ground and fragmented sod. **Below photo:** 1999 PP 13 Big Whitney Meadow Section 5, photo was retaken September 2010. Channel and floodplain have moderately aggraded and is expanding upwards to terraces, terraces and slopes are filling in with riparian vegetation and bare soil areas have diminished but still exist. Hummocks have lessened in form but are still present. Water table has elevated, site is wet and sensitive to disturbance. Floodplain vegetation is dense and well rooted and should resist impact.

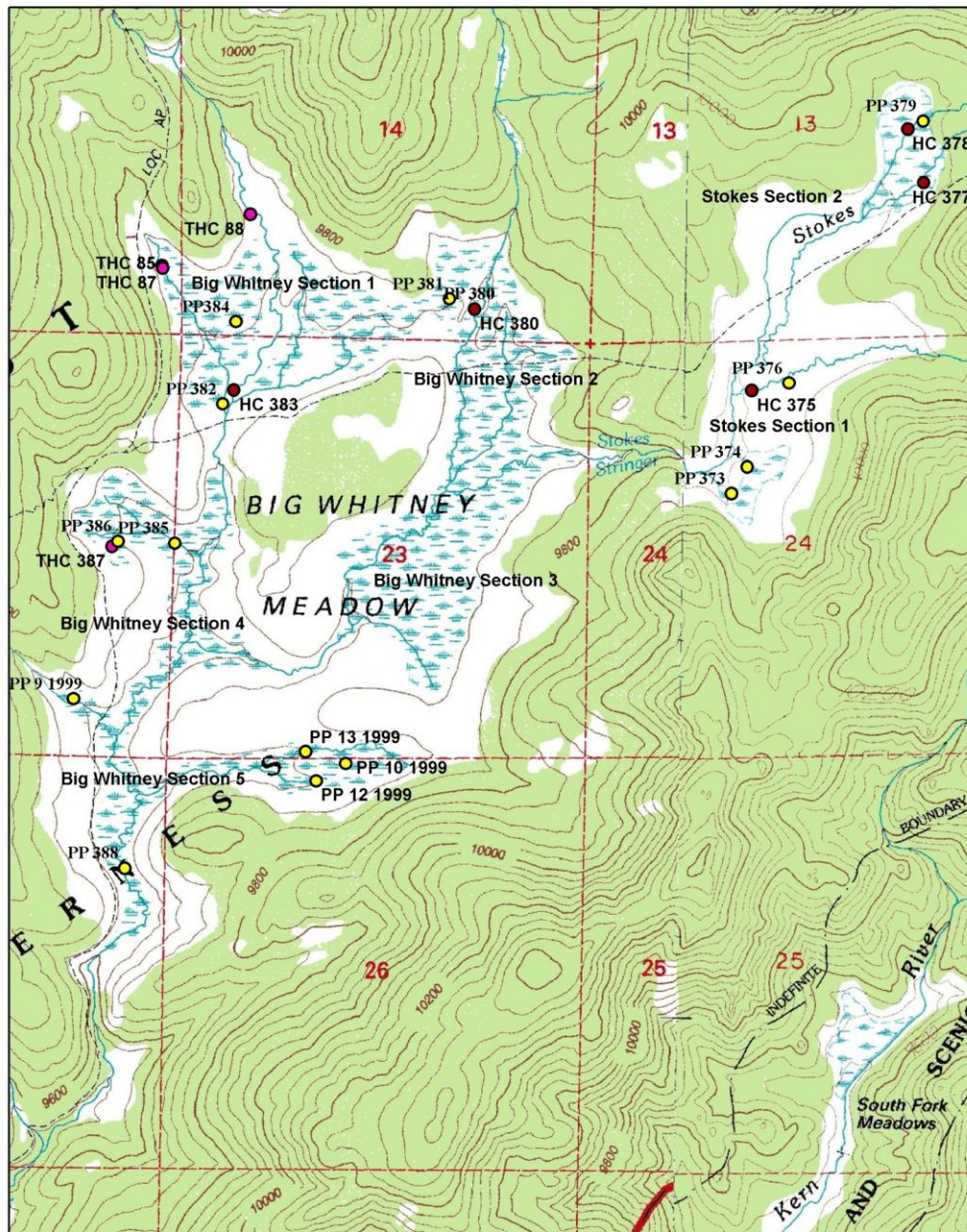


Above photo: Photo point 12 (1999) Big Whitney meadow Section 5, September 2003. Terraces and banks along floodplain channel have widespread, eroded hummocks and bare ground areas, unstable. **Below photo:** PP 12 1999 Big Whitney Meadow Section 5, photo was retaken September 2010. Floodplain and channel have elevated nearing terrace elevations, hummocks are present but diminished in form and have better vegetative cover and the local water table has also elevated assisting robust riparian vegetation development. Bare soil areas are less.



Above photo: 1999 monitoring photo point Roll 8 #24 Big Whitney Meadow Section 5, September 2003. Same photo was also taken in 1999. Unstable, incised gullies and active head cuts exist, hummocks are found on terraces. **Below photo:** 1999 PP Roll 8 # 24, photo was retaken September 2010. Gullies have significantly aggraded along with water table and very increased riparian vegetation in floodplain and terrace areas. Hummocks have diminished and vegetation on hummocks very improved with much less exposed soil. Site is wet and vulnerable, strong riparian vegetation will resist impacts and continue floodplain aggradation and water table.

Big Whitney - Stokes Stringer Monitoring Sites



Legend

- Whitney HCs
- Whitney PPs
- Whitney THC's

0 0.25 0.5 1 Miles

N
Scale 1:22,000